

**REMARKS**

Claims 1-14 are pending in this application. By this Amendment, claims 2-4 are amended and claim 1 is canceled. Support for the amendments can be found in the specification at, for example, paragraphs [0052], [0059], [0072] and Examples 1-5. No new matter is added. Reconsideration based on the amendments and following remarks is respectfully requested.

**I. 35 U.S.C. §112 Rejection**

The Office Action rejects claims 1-7 and 10-14 under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement.

With regard to the §112, first paragraph, rejection, the Office Action asserts that the claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventors, at the time of filing, had possession of the claimed invention. The Office Action also asserts that Applicants have not pointed out where the amended claims are supported. The Office Action further asserts that there does not appear to be a written description of the claim limitation "triazine trione skeleton" found in the application as filed.

Applicants respectfully submit that the claims, as amended, obviate the rejection. Specifically, Applicants have amended the claims 2-4 to recite "a s-triazine trione skeleton." The compounds disclosed in the present application and cited by the Examiner are s-triazine trione compounds. The compounds of formula 2 are s-triazine trione compounds having an epoxy group, and the specific examples thereof include tris(2,3-epoxypropyl) isocyanurate, monoallyl diglycidyl isocyanurate and the like (see paragraph [0060] of the specification).

Additionally, the polymer having an epoxy group can be produced by polymerization of the addition of polymerizable monomers having an epoxy group with other addition of polymerizable monomers. The polymer can be produced by reaction of a polymer having a

hydroxy group with a compound having an epoxy group such as epichlorohydrin, glycidyl tosylate or the like (see paragraphs [0019]-[0021] and [0030]).

With regard to s-triazine trione compounds having carboxyl groups, the compounds of formula (1) are exemplified, and specific examples thereof include tris(2-carboxyethyl) isocyanuric acid, tris(3-carboxypropyl) isocyanuric acid and the like (see paragraph [0052] of the specification).

With regard to compounds having protected carboxyl groups, the specification states at paragraph [0054] as follows:

The compound with a molecular weight of 2000 or less having at least two protected carboxyl groups includes for example terephthalic acid, trimellitic acid, pyromellitic acid, isophthalic acid, tris(2-carboxyethyl) isocyanuric acid, tris(3-carboxypropyl) isocyanuric acid, adipic acid, maleic acid, itaconic acid, fumaric acid, butane tetracarboxylic acid and the like which are converted with propyl vinyl ether into a form of hemiacetal.

Further, the specification states at paragraph [0039] that the polymer having a phenolic hydroxyl group, a carboxyl group, a protected carboxyl group or an acid anhydride structure can be produced by polymerization of the above-mentioned addition of polymerizable monomers having a phenolic hydroxyl group, a carboxyl group, a protected carboxyl group or an acid anhydride structure with other addition of polymerizable monomers.

As mentioned above, the polymers and compounds having s-triazine trione structures are disclosed in the specification as filed, and thus these polymers and compounds should not be regarded as new matter.

Reconsideration and withdrawal of the rejection is respectfully requested.

## **II. Rejections Under 35 U.S.C. § 102(b)**

### **A. Lees**

The Office Action rejects claims 2 and 8 under 35 U.S.C. §102(b) as being anticipated by Lees et al. (5,380,804). However, Lees does not disclose every limitation of independent claim 1. Thus, the rejection is respectfully traversed.

Independent claim 2 specifies, *inter alia*, a resist underlayer anti-reflective coating forming composition for use in a lithography process of manufacture of a semiconductor device comprising a polymer compound having an epoxy group and a compound with a molecular weight of 2000 or less having at least two carboxyl groups, or protected carboxyl groups, and a solvent, wherein at least one of the polymer compound and the compound has a s-triazine trione skeleton.

At most, Lees discloses a curable powder coating that is cured to provide a simple, general use hard-coating for automotive industrial applications (Lees, col. 1, lines 55-67). The coating of Lees is simply used as a scratch-resistant hard coating, thus the coating of Lees is not required to absorb light. In addition, the coating of Lees is applied to the whole surface to be coated, and no part of the coating is subsequently removed because the coating is not used in a lithography process. In contrast, in the claimed invention, the s-triazine trione skeleton absorbs light having the wavelength of exposure of resist, and it is further required that the unnecessary parts of the coating are subjected to selective etching in lithography. Thus, the antireflective coating of the claimed invention must have a higher dry etching rate than the resist; otherwise, a pattern cannot be transferred to the underlayer. The present inventors also determined that the s-triazine trione structure is effective in improving both the anti-reflective property and the dry etching rate of the antireflective coating.

The Office Action asserts that the formulations contained in Example 3, part A of Lees anticipates the instant composition because both the instant composition and the

composition of Lees have the same component and thus have the ability to form a composition which will be both coatable and antireflective. However, Applicants respectfully disagree with this assertion.

In Example 3, Lees discloses that the s-triazine trione compound is simply used to crosslink an already polymerized glycidyl methacrylate (GMA) copolymer (Lees, col. 5, lines 43-60). Thus, in Lees the s-triazine trione compound is used only as a crosslinking agent and is an accessory component of the polymer. However, the claimed invention uses a compound having an s-triazine trione skeleton as main component of the polymer. Thus, the s-triazine trione compound is not used simply as a crosslinking agent for an already polymerized polymer. Thus, the claimed compound does not inherently have the same properties as the compound disclosed in Lees.

Lees thus fails to disclose a resist underlayer anti-reflective coating forming composition comprising a polymer compound having an epoxy group and a compound with a molecular weight of 2000 or less having at least two carboxyl groups, or protected carboxyl groups, and a solvent, wherein at least one of the polymer compound and the compound has a s-triazine trione skeleton, as claimed. Accordingly, Lees does not anticipate independent claim 2.

Claim 8 depends from independent claim 2. Because Lees fails to teach the features recited in independent claim 2, dependent claim 8 is patentable for at least the reasons that claim 2 is patentable, as well as for the additional features it recites.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

**B. Derwent**

The Office Action rejects claims 3 and 9 under 35 U.S.C. §102(b) as being anticipated by Derwent-Acc-No: 1986-290577. However, Derwent does not disclose every limitation of independent claim 3. Thus, the rejection is respectfully traversed.

Independent claim 3 specifies, *inter alia*, a resist underlayer anti-reflective coating forming composition comprising a compound with a molecular weight of 2000 or less having at least two epoxy groups and a polymer compound having a phenolic hydroxyl group, a carboxyl group, a protected carboxyl group or an acid anhydride structure, and a solvent, wherein at least one of the compound and the polymer compounds has a s-triazine trione skeleton.

Specifically, the Office Action reasserts that because the composition of novolak resin and triglycidyl isocyanurate has the "inherent capability" to be an undercoating, the Derwent reference anticipates the claimed composition. However, Applicants respectfully submit that Derwent fails to disclose the presently claimed combination of features because Applicants' claim is to an anti-reflective coating composition whereas the disclosure in Derwent applies to the production of glass fibers. In addition, nowhere does Derwent disclose that the composition further contains a solvent.

Derwent thus fails to disclose a resist underlayer anti-reflective coating forming composition for use in a lithography process of manufacture of a semiconductor device comprising compound having a molecular weight of 2000 or less having at least two epoxy groups and a polymer compound having a phenolic hydroxyl group, carboxyl group, protected carboxyl group or an acid anhydride structure, and a solvent, wherein at least one of the compound in the polymer compounds has a s-triazine trione skeleton, as claimed. Derwent thus does not anticipate Applicants' independent claim 3.

Claim 9 depends from independent claim 3. Because Derwent fails to teach the features recited in independent claim 3, dependent claim 9 is patentable for at least the reasons that claim 3 is patentable, as well as for the additional features it recites.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

**C. Hitachi**

The Office Action rejects claims 3 and 9 under 35 U.S.C. §102(b) as being anticipated by Hitachi (JP 58-107312 A) and attached English abstract. However, Hitachi does not disclose every limitation of independent claim 3. Thus, the rejection is respectfully traversed.

The Office Action asserts that the composition of novolak resin and triglycidyl isocyanurate set forth by Hitachi anticipates the claimed combination of features because it has the inherent capability of being an undercoating. However, Hitachi appears to disclose a composition containing a novolak-type resin and diglycidyl ether type of bis-phenol A (Hitachi, Abstract). However, nowhere does Hitachi disclose a compound having a s-triazine trione skeleton. Hitachi further fails to disclose that the composition further contains a solvent (Hitachi, Abstract). In fact, Hitachi discloses that the composition is a non-solvent melting resin composition (Hitachi, Abstract). In addition, Hitachi relates to laminated plate, whereas the present invention relates to a resist underlayer anti-reflective coating forming composition for use in a lithography process.

Hitachi thus fails to disclose a resist underlayer anti-reflective coating forming composition for use in a lithography process of manufacture of a semiconductor device comprising compound having a molecular weight of 2000 or less having at least two epoxy groups and a polymer compound having a phenolic hydroxyl group, carboxyl group, protected carboxyl group or an acid anhydride structure, and a solvent, wherein at least one of the

compound in the polymer compounds has a s-triazine trione skeleton, as claimed. Hitachi thus does not anticipate Applicants' independent claim 3.

Claim 9 depends from independent claim 3. Because Hitachi fails to teach the features recited in independent claim 3, dependent claim 9 is patentable for at least the reasons that claim 3 is patentable, as well as for the additional features it recites.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

**D. Harada**

The Office Action rejects claims 3 and 9 under 35 U.S.C. §102(b) as being anticipated by Harada et al. (EP 1 203 792 A1) as set forth in Comparative Example B4. However, Harada does not disclose every limitation of independent claim 3. Thus, the rejection is respectfully traversed.

At most, Comparative Example B4 of Harada discloses a resin composition for semiconductor encapsulation comprised of triglycidyl isocyanurate, an allylated phenol novolak resin, a microcapsule type curing accelerator and spherical fused silica powder as an inorganic filler. However, nowhere does Harada disclose that the composition further contains a solvent (Harada, Table 14, Comparative Example B4). Harada further relates to a resin composition for semiconductor encapsulation, whereas the present invention relates to a resist underlayer anti-reflective coating forming composition for use in a lithography process.

Harada thus fails to disclose a resist underlayer anti-reflective coating forming composition for use in a lithography process of manufacture of a semiconductor device comprising compound having a molecular weight of 2000 or less having at least two epoxy groups and a polymer compound having a phenolic hydroxyl group, carboxyl group, protected carboxyl group or an acid anhydride structure, and a solvent, wherein at least one of the

compound in the polymer compounds has a s-triazine trione skeleton, as claimed. Harada thus does not anticipate Applicants' independent claim 3.

Claim 9 depends from independent claim 3. Because Harada fails to teach the features recited in independent claim 3, dependent claim 9 is patentable for at least the reasons that claim 3 is patentable, as well as for the additional features it recites.

Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

### **III. Rejections Under 35 U.S.C. § 103(a)**

#### **A. Kishioka**

The Office Action rejects claims 3 and 9 under 35 U.S.C. §103(a) as being unpatentable over Kishioka et al. (either as US2004/0110096A1 or as WO02/086624A1 as evidenced by US2004/0110096A1). The rejection is respectfully traversed.

Independent claim 3 specifies, *inter alia*, a resist underlayer anti-reflective coating forming composition comprising a compound with a molecular weight of 2000 or less having at least two epoxy groups and a polymer compound having a phenolic hydroxyl group, a carboxyl group, a protected carboxyl group or an acid anhydride structure, and a solvent, wherein at least one of the compound and the polymer compounds has a s-triazine trione skeleton.

At most, Kishioka teaches that a cyanuric acid or a derivative thereof, represented by formula (1), may be mixed with a resin and dissolved in a solvent (Kishioka, paragraph [0025]). The Office Action asserts that the resins used to mix with the formula (1) compounds are set forth in paragraph [0043] of Kishioka. However, the resins disclosed in paragraph [0043] of Kishioka are limited to cases 1-4 (Kishioka, paragraphs [0042]-[0043]). However, none of cases 1-4 teaches a composition that contains a solvent. Kishioka thus fails to teach or suggest a composition comprising a compound with a molecular weight of 2000 or



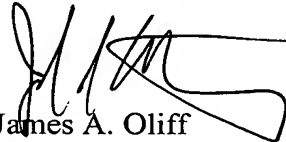
less having at least two epoxy groups and a polymer compound having a phenolic hydroxyl group, a carboxyl group, a protected carboxyl group or an acid anhydride structure, and a solvent, wherein at least one of the compound and the polymer compounds has a s-triazine trione skeleton, as claimed.

**IV. Conclusion**

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-14 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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Attachment:  
Petition for Extension of Time

Date: July 31, 2008

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